

We claim:

1. A transmission node comprising
- apparatus that receives at an input via a transmission path an optical signal formed from a plurality of optical signals of respective wavelengths, in which the levels of individual ones of the optical signals may have been affected by Raman scattering occurring along the transmission path,
- sensor apparatus operative for generating a first signal, P_0 , indicative of the total power across a group of the received optical signals, and a second signal, P_1 , indicative of the total power across the group of optical signals after those signals have been subjected to a predetermined weighting function, and
- controller apparatus for offsetting the affect of such Raman scattering as a function of the sum of the levels of the first and second signals.
2. The optical node of claim 1 wherein the sensor apparatus includes multiplier apparatus operative for multiplying the signal P_0 by a first constant, C_0 , and for multiplying the signal P_1 by a second constant C_1 , and combiner apparatus for combining the product P_0C_0 with the product P_1C_1 to form a signal, P_R , indicative of the degree to which the group of signals were affected by Raman scattering.
3. The optical node of claim 1 wherein the plurality of optical signals includes different bands of optical signals and wherein the node further comprises a bandpass filter to filter one of the bands of optical signals to form the group signals.

1 4. The node of claim 3 wherein the sensor includes a total power
2 detector and apparatus for supplying a first portion of the power of the group
3 of signals to the total power detector and for supplying a second portion of
4 the power of the group of signals to the predetermined weighting function
5 which generates a weighted version of the group of signals.

1 5. The optical node of claim 4 wherein the predetermined weighting
2 function includes a router which demultiplexes the group of signals, supplies
3 the demultiplexed signals to weighting apparatus to reduce the level of power
4 of individual ones of the demultiplexed signals proportional to their respective
5 wavelengths, and then routes the weighted signals to a multiplexed output for
6 delivery to a power detector operative for detecting the power across the
7 weighted signals and generating signal P_1 .

1 6. The optical node of claim 5 wherein the weighting apparatus is a
2 variable reflection device.

1 7. The optical node of claim 5 wherein the weighting apparatus is a
2 variable loss device.

1 8. A sensor comprising
2 apparatus for receiving a plurality of optical signals and filtering the
3 plurality of signals to form a group of signals,
4 first apparatus for processing a first portion of the power levels of the
5 group of signals to generate a first power signal, P_0 ,
6 second apparatus for processing a second portion of the power levels
7 of the group of signals to form a group of weighted signals, and processing

8 the group of weighted signals to generate a second weighted power signal, P_1 ,
9 and

10 third apparatus for generating, as a function of the first and second
11 power signals, P_0 and P_1 , a signal indicative of whether a particular
12 transmission impairment has affected the levels of individual ones of the
13 received plurality of optical signals.

1 9. The sensor of claim 8 wherein the transmission impairment is Raman
2 scattering.

1 10. The sensor of claim 8 wherein the sensor apparatus further
2 comprises

3 multiplier apparatus operative for multiplying the signal P_0 by a first
4 constant, C_0 , and for multiplying the signal P_1 by a second constant C_1 , and
5 combiner apparatus for combining the product P_0C_0 with the product
6 P_1C_1 to form a signal, P_R , indicative of the degree to which the plurality of
7 optical signals were affected by the transmission impairment.

1 11. The sensor of claim 8 wherein the plurality of optical signals
2 includes different bands of optical signals and wherein the apparatus for
3 filtering is a bandpass filter.

1 12. The sensor of claim 11 wherein the second apparatus includes a
2 router to demultiplex the group of signals, supply the demultiplexed signals to
3 weighting apparatus to reduce the level of power of individual ones of the
4 demultiplexed signals proportional to their respective wavelengths, and then
5 route the weighted signals to a multiplexed output for delivery to a power
6 detector operative for detecting the power across the weighted signals and
7 generating signal P_1 .

1 13. The optical node of claim 12 wherein the weighting apparatus is a
2 variable reflection device.

1 14. The optical node of claim 12 wherein the weighting apparatus is a
2 variable loss device.